

1 ~~5027~~ 1. (Amended) A system for verifying the purported identity of a
2 targeted individual comprising:
3 an enrollment database including tissue optical spectra collected from at
4 least one enrolled persons, said enrolled persons tissue optical spectra having a plurality
5 of measurement wavelengths;
6 means for obtaining at least one tissue optical spectra and purported
7 identity from said target individual, said target individual's tissue optical spectra having a
8 plurality of measurement values, wherein said measurement values are correlated with
9 tissue properties that are invariant at a wavelength of illumination light with respect to the
10 presence and intensity of other wavelengths of illumination light;
11 means for comparing said target individual tissue optical spectra and said
12 enrolled persons tissue optical spectra, said enrolled person tissue optical spectra
13 corresponding to the purported identity of the target individual, said comparison
14 providing a measure of the degree of similarity between said target individual tissue
15 optical spectra and said enrolled person's tissue optical spectra; and
16 means for positively verifying said target individual's identity by
17 confirming that said target individual's measure of spectral similarity is at least as similar
18 as an established threshold value.

1 2. (Amended) The system as recited in claim 1, wherein said means
2 for obtaining said target individual tissue optical spectra includes means for measuring
3 optical radiation reflected from sub-epidermal tissue of said target individual.

1 ~~5027~~ 3. (Amended) The system as recited in claim 1, wherein said means
2 for obtaining said target individual tissue optical spectra includes a spectrometer.

1 4. (As Filed) The system as recited in claim 3, wherein said
2 spectrometer is an FTIR spectrometer.

1 5. (As Filed) The system as recited in claim 3, wherein said
2 spectrometer is a grating array spectrometer.

1 6. (Amended) The system as recited in claim 1, wherein said optical
2 spectra include near-infrared wavelengths.

1 7. (Amended) The system as recited in claim 1, wherein said optical
2 spectra include visible wavelengths.

1 8. (Amended) The system as recited in claim 1, wherein said optical
2 spectra include near-ultraviolet wavelengths.

1 9. (As Filed) The system as recited in claim 1, wherein said
2 comparison and similarity determination utilizes a classification algorithm.

1 10. (Twice Amended) A system for identifying a target individual
2 comprising:
3 an enrollment database including tissue optical spectral data collected
4 from one or more enrolled persons, said enrolled persons tissue optical spectra having a
5 plurality of measurement wavelengths;
6 means for obtaining at least one tissue optical spectra from said target
7 individual, wherein said means for obtaining said target individual tissue optical spectra
8 includes means for measuring optical radiation reflected from sub-epidermal tissue of
9 said target individual, said target individual's tissue optical spectra having a plurality of
10 measurement values, wherein said measurement values are correlated with tissue
11 properties that are invariant at a wavelength of illumination light with respect to the
12 presence and intensity of other wavelengths of illumination light;
13 means for comparing said target individual tissue optical spectra and said
14 all enrolled persons tissue optical spectra, said comparison providing a measure of the

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15 degree of similarity between said target individual's tissue optical spectra and said
16 enrolled persons tissue optical spectra; and
17 means for indicating identity as at least one of the said enrolled persons if
18 the corresponding measure of degree of similarity is at least as similar as an established
19 threshold value.

1 11. (Previously Canceled).

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1 427 12. (Amended) The system as recited in claim 10, wherein said means
2 for obtaining said target individual's tissue optical spectra includes a spectrometer.

1 13. (As Filed) The system as recited in claim 12, wherein said
2 spectrometer is an FTIR spectrometer.

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1 14. (As Filed) The system as recited in claim 12, wherein said
2 spectrometer is a grating array spectrometer.

1 15. (Amended) The system as recited in claim 10, wherein said optical
2 spectra include near-infrared wavelengths.

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1 16. (Amended) The system as recited in claim 10, wherein said optical
2 spectra include visible wavelengths.

1 17. (Amended) The system as recited in claim 10, wherein said optical
2 spectra include near-ultraviolet wavelengths.

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1 18. (As Filed) The system as recited in claim 10, wherein said
2 comparison and similarity determination utilizes a classification algorithm.

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1 575 19. (Amended) A system for verifying the purported identity of a
2 target individual comprising:
3 a computer including an input device and an output device;

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4 an enrollment database including tissue optical spectra for at least one
5 enrolled persons;

6 means for obtaining at least one tissue optical spectrum from said target
7 individual, including an optical radiation source, an optical sampler for projecting optical
8 radiation into the tissue and for collecting radiation that substantially passed through sub-
9 epidermal tissue, an optical spectrometer for measuring the sub-epidermal optical
10 intensity over a plurality of wavelengths, wherein said target individual's tissue optical
11 spectrum has a plurality of measurement values correlated with tissue properties that are
12 invariant at a wavelength of illumination light with respect to the presence and intensity
13 of other wavelengths of illumination light;

14 means for obtaining said target individual's purported identity; and

15 a program running in said computer for comparing said target individual
16 tissue optical spectrum and said enrolled persons tissue optical spectra corresponding to
17 said target individual's purported identity.

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1 20. (Amended) A system for identifying a target individual
2 comprising:

3 a computer including an input device and an output device;

4 an enrollment database including tissue optical spectra for at least one
5 enrolled persons;

6 means for obtaining at least one tissue optical spectrum from said target
7 individual, including an optical radiation source, an optical sampler for projecting optical
8 radiation into the tissue and for collecting radiation that substantially passed through sub-
9 epidermal tissue, an optical spectrometer for measuring the sub-epidermal optical
10 intensity over a plurality of wavelengths, wherein said target individual's tissue optical
11 spectrum has a plurality of measurement values correlated with tissue properties that are
12 invariant at a wavelength of illumination light with respect to the presence and intensity
13 of other wavelengths of illumination light; and

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14 a program running in said computer for comparing said target individual
15 tissue optical spectrum and all said enrolled persons tissue optical spectra.

1 21. (Amended) A method for verifying the purported identity of a
2 target individual utilizing an enrollment database including tissue optical spectra
3 collected from a number of enrolled individuals having known identities, said tissue
4 optical spectra having a plurality of measurement wavelengths, comprising the steps of:
5 obtaining optical target tissue spectral data from said target individual,
6 said optical target tissue spectral data having a number of measurement values, wherein
7 said measurement values are correlated with tissue properties that are invariant at a
8 wavelength of illumination light with respect to the presence and intensity of other
9 wavelengths of illumination light;
10 obtaining said purported identity from said target individual;
11 comparing said optical target tissue spectra and said enrolled person's
12 tissue optical spectra, said enrolled person's tissue optical spectra corresponding to the
13 purported identity of the target individual, said comparison providing a measure of the
14 degree of similarity between said optical target tissue spectra and said enrolled person's
15 tissue optical spectra; and
16 positively verifying said target individual's identity by confirming that
17 said target individual's measure of spectral similarity is at least as similar as an
18 established threshold value.

1 22. (As Filed) The method for verifying the identity of a target
2 individual as recited in claim 21, wherein the method further includes a classification
3 algorithm to perform said comparison between said target individual's optical spectral
4 data and said enrolled person's optical spectral data.

1 23. (As Filed) The method for verifying the identity of a target
2 individual as recited in claim 22, wherein the method further includes classification

3 features that are determined from a set of calibration optical spectral data collected on at
4 least one individual measured more than one time.

1 24. (As Filed) The method for verifying the identity of a target
2 individual as recited in claim 23, wherein said classification features are applied to the
3 said comparison between the target optical spectral data and the enrollment spectral data
4 to determine the similarity with respect to the said classification features.

1 25. (As Filed) The method for verifying the identity of a target
2 individual as recited in claim 24, wherein said verification occurs when said comparison
3 of said target optical spectral data and said enrollment spectral data using said
4 classification features is at least as good a predetermined measure of similarity.

1 26. (As Filed) The method for identifying a target individual as
2 recited in claim 21, further comprising an enrollment database with optical spectral data
3 collected from a number of enrolled individuals, wherein said number is greater than one.

1 27. (As Filed) The method for identifying a target individual as
2 recited in claim 21, further comprising an enrollment database with optical spectral data
3 collected from a number of enrolled individuals, wherein said number is equal to one.

1 28. (As Filed) The method for identifying a target individual as
2 recited in claim 21, wherein said target spectrum is added to said enrollment optical
3 spectral data after said verification of identity.

1 29. (As Filed) The method for identifying a target individual as
2 recited in claim 21, wherein said tissue optical spectra include near-ultraviolet
3 wavelengths.

1 30. (As Filed) The method for identifying a target individual as
2 recited in claim 21, wherein said tissue optical spectra include visible wavelengths.

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1 31. (As Filed) The method for identifying a target individual as
2 recited in claim 21, wherein said tissue optical spectra include near-infrared wavelengths.

n.e. 1 32. (As Filed) The method for identifying a target individual as
2 recited in claim 21, wherein said tissue spectra includes a substantial spectra contribution
3 from sub-epidermal tissue.

1 33. (Twice Amended) A method for identifying a target individual
2 utilizing an enrollment database including tissue optical spectra collected from a number
3 of enrolled persons, said tissue optical spectra having a plurality of measurement
4 wavelengths, comprising the steps of:
5 obtaining optical target tissue spectral data from said target individual,
6 said optical target tissue spectral data having a number of measurement values and
7 including a substantial spectral contribution from sub-epidermal tissue, wherein said
8 measurement values are correlated with tissue properties that are invariant at a
9 wavelength of illumination light with respect to the presence and intensity of other
10 wavelengths of illumination light;
11 comparing said optical target tissue spectral data and said enrolled
12 person's tissue optical spectra, said comparison providing a measure of the degree of
13 similarity between said optical target tissue spectral data and each of said enrolled
14 person's tissue optical spectra; and
15 positively establishing said target individual's identity by confirming that
16 said target individual's measure of spectral similarity is at least as similar to one of the
17 enrolled person's optical spectral data as an established threshold value.

n.e. 1 34. (As Filed) The method for identifying a target individual as
2 recited in claim 33, wherein the method further includes a classification algorithm to
3 perform said comparison between said target individual's optical spectral data and said
4 enrolled persons optical spectral data.

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1 35. (As Filed) The method for identifying a target individual as
2 recited in claim 34, wherein the method further includes classification features that are
3 determined from a set of calibration optical spectral data collected on at least one
4 individual measured more than one time.

1 36. (As Filed) The method for identifying a target individual as
2 recited in claim 35, wherein said classification features are applied to the said comparison
3 between the target optical spectral data and the enrollment spectral data to determine the
4 similarity with respect to the said classification features.

1 37. (As Filed) The method for identifying a target individual as
2 recited in claim 36, wherein said identification occurs when said comparison of said
3 target optical spectral data and said enrollment spectral data using said classification
4 features is at least as similar as a predetermined measure of similarity for a number of
5 enrolled persons optical spectral data.

1 38. (As Filed) The method for identifying a target individual as
2 recited in claim 37, wherein the target identify is chosen as the most similar of all said
3 enrolled persons whose enrollment spectral data are at least as similar to the said target
4 spectral data as a predetermined measure of similarity.

1 39. (As Filed) The method for identifying a target individual as
2 recited in claim 33, further comprising an enrollment database with optical spectral data
3 collected from a number of enrolled individuals, wherein said number is greater than one.

1 40. (As Filed) The method for identifying a target individual as
2 recited in claim 33, further comprising an enrollment database with optical spectral data
3 collected from a number of enrolled individuals, wherein said number is equal to one.

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1 41. (As Filed) The method for identifying a target individual as
2 recited in claim 33, wherein said target spectrum is added to said enrollment optical
3 spectral data after said identification.

1 42. (As Filed) The method for identifying a target individual as
2 recited in claim 33, wherein said tissue optical spectra include near-ultraviolet
3 wavelengths.

1 43. (As Filed) The method for identifying a target individual as
2 recited in claim 33, wherein said tissue optical spectra include visible wavelengths.

1 44. (As Filed) The method for identifying a target individual as
2 recited in claim 33, wherein said tissue optical spectra include near-infrared wavelengths.

1 45. (Previously Canceled).

1 46. (Amended) A method for verifying the identity of a target
2 individual comprising the steps of:
3 obtaining a number of enrollment optical tissue spectra from a number of
4 individuals, said enrollment optical tissue spectra having a plurality of measurement
5 wavelengths, said enrolled optical tissue spectra corresponding to said enrolled
6 individual's identities;
7 obtaining an optical target tissue spectrum from said target individual, said
8 optical target tissue spectrum having a number of measurement values, wherein said
9 measurement values are correlated with tissue properties that are invariant at a
10 wavelength of illumination light with respect to the presence and intensity of other
11 wavelengths of illumination light;
12 obtaining an identifier from said target individual;
13 selecting said enrolled optical tissue spectra that corresponds to said target
14 individual's identifier;

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can 15 performing discriminant analysis on said optical target tissue spectrum and
16 said selected enrolled optical tissue spectrum corresponding to said identifier; and
17 positively verifying said target identity if, and only if, said discriminant
18 analysis is satisfied

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1 47. (Twice Amended) A method for identifying a target individual
2 comprising the steps of:
3 obtaining a number of enrollment optical tissue spectra from a number of
4 individuals, said enrollment optical tissue spectra having a plurality of measurement
5 wavelengths;
6 obtaining an optical target tissue spectrum from said target individual, said
7 optical target tissue spectrum having a number of measurement values, wherein said
8 optical tissue spectra include a substantial spectral contribution from sub-epidermal tissue
9 and wherein said measurement values are correlated with tissue properties that are
10 invariant at a wavelength of illumination light with respect to the presence and intensity
11 of other wavelengths of illumination light;
12 performing discriminant analysis on said optical target tissue spectrum and
13 all of said enrollment optical tissue spectra; and
14 positively identifying said target identity if, and only if, said discriminant
15 analysis is satisfied for at least one of said enrolled persons optical tissue spectral data

1 48. (Canceled)
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49. (New) A system for identifying a targeted individual comprising:
an enrollment database including tissue optical spectra collected from at
least one enrolled person, each of said enrolled person's tissue optical spectrum having a
plurality of measurement wavelengths;
a spectrometer adapted to obtain at least one tissue optical spectrum from
said target individual by measuring optical radiation reflected from subepidermal tissue

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